

THE CLAIMS

- 1 1. A method of routing packets within a communication system, comprising the steps of:
 - 2 receiving a packet from a communications network;
 - 3 allocating a message block header within said received packet;
 - 4 associating a predefined default value for said message block header;
 - 5 identifying a quality-of-service value associated with said received packet;
 - 6 metering the received packet to determine whether resources are available to properly route the packet while complying with a service level agreement associated with said classified quality-of-service;
 - 7
 - 8 in response to a determination that said packet cannot be routed in compliance with said service level agreement, dropping said packet; otherwise, routing said packet
 - 9
- 1 2. The method of claim 1 further comprising the steps of:
 - 2 determining whether said identified quality-of-service value is different than said associated predefined default value for said message block header; and
 - 3
 - 4 in response to said determination, overwriting said message block header with said identified quality-of-service value.
 - 5
- 1 3. The method of Claim 1 wherein said step of routing said packet further comprises the steps of:
 - 2 determining whether an outgoing device driver is available for said quality-of-service value; and
 - 3
 - 4 in response to a determination that said outgoing device driver is unavailable, queuing said packet within one of a plurality of primary queues associated with said identified quality-of-service value.

- 1 4. The method of Claim 3 wherein said step of queuing said packet further comprises the steps of:
 - 2 assigning a predefined threshold value with each of said plurality of primary queues;
 - 3 monitoring each of said plurality of primary queues to determine whether the capacity level
 - 4 associated with said queue exceeds said predefined threshold value; and
 - 5 queuing any additional packets, in response to said determination, to one of a plurality of
 - 6 secondary queues associated with said identified quality-of-service value.
- 1 5. The method of Claim 4 wherein certain of said plurality of secondary queues are assigned to one
- 2 of said plurality of primary queues.
- 1 6. The method of Claim 5 wherein one of said plurality of secondary queues is an expedited
- 2 forwarding queue, further comprising the steps of queuing said packet identified as expedited
- 3 forwarding value within said expedited forwarding queue.
- 1 7. The method of claim 3 wherein said plurality of primary queues comprises:
 - 2 a high priority egress queue;
 - 3 a medium priority egress queue; and
 - 4 a low priority egress queue.
- 1 8. The method of Claim 1 wherein packets identified with particular one of said quality-of-service
- 2 value is guaranteed a predefined bandwidth within said communication system.

- 1 9. A packet router within a packet communication network for providing differentiated services
2 based on a service level agreement associated with a plurality of incoming packets to be
3 processed and routed within said packet router, comprising:
 - 4 a ingress driver for receiving said plurality of incoming packets;
 - 5 a classifier coupled to said ingress driver for classifying each of said plurality of packets with a
6 particular behavior aggregate value wherein said behavior aggregate value is indicative of the internal
7 routing treatment to be provided by said packet router for said each packet;
 - 8 a meter coupled to said classifier for evaluating some of said plurality of packets and discarding
9 certain ones of said packets wherein the service level agreement associated with said identified behavior
10 aggregate value cannot be guaranteed;
 - 11 a differentiated queuing block coupled to said meter and said classifier for handling said plurality
12 of packets; and
 - 13 a egress driver coupled to said differentiated queuing block for transmitting some of said plurality
14 of packets over said packet communications network.
- 1 10. The packet router of Claim 9 wherein said ingress driver further comprises means for allocating a
2 message block header for each of said packets for storing said behavior aggregate value.
- 1 11. The packet router of Claim 10 wherein said egress driver comprises means for stripping said
2 message block header within each of said packets before transmitting each of said packet over
3 said communications network.
- 1 12. The packet router of Claim 10 wherein said classifier further comprises a table for mapping a
2 differentiated services code point (DSCP) stored within each of said packets to an associated
3 behavior aggregate value and means for storing said behavior aggregate value within said
4 message block header.

1 13. The packet router of Claim 9 wherein said classifier further comprises a filter for determining
2 whether particular ones of said plurality of packets need to be evaluated by said meter and
3 forwarding such determined packets to said meter.

1 14. The packet router of Claim 9 wherein said differentiated queuing block further comprises a
2 plurality of primary queues for queuing some of said packets when resources within said egress
3 driver are not available.

1 15. The packet router of Claim 14 wherein some of said packets are classified as expedited
2 forwarding, assured forwarding or best efforts forwarding and wherein said plurality of primary
3 queues further comprises:

4
5 a high priority egress queue for queuing packets that are classified expedited forwarding;
6
7 a medium priority egress queue for queuing packets that are classified assured forwarding; and
8
9 a low priority egress queue for queuing packets that are classified best effort forwarding.

10 16. The packet router of Claim 15 wherein said differentiated queuing block further comprises a
11 plurality of secondary queues for queuing some of said packets when certain one of said primary
12 queues exceeds a predefined threshold content value.

13 17. The packet router of Claim 16 wherein said plurality of secondary queues further comprises:
14 an expedite forwarding queue for queuing packets that are classified expedited forwarding;
15 an assured forwarding queue for queuing packets that are classified assured forwarding; and
16 a best effort queue for queuing packets that are classified best efforts forwarding.

17 18. The packet router of Claim 17 wherein each of said secondary queues further comprises a token
18 bucket meter for keeping track of the bandwidth rate available for said associated behavior
19 aggregate value.

- 1 19. An apparatus for providing differentiated service routing within a packet communication system,
2 comprising the steps of:
3 means for receiving a packet from a communications network;
4 means for allocating a message block header within each of said received packet;
5 means for assigning behavior aggregate value for each of said received packets;
6 means for metering some of said received packets to determine whether resources are available to
7 properly route said packets while complying with a service level agreement associated with said behavior
8 aggregate value;
9 in response to a determination that a particular packet cannot be routed in compliance with said
10 service level agreement,
11 means for dropping said packet;
12 otherwise, means for routing said packet.

1 20. The apparatus of Claim 19 wherein said means for routing said packet further comprises:
2 a plurality of primary queues;
3 means for determining whether an outgoing device driver is available; and
4 in response to a determination that said outgoing device driver is unavailable, means for queuing
5 said packet within one of said plurality of primary queues.

- 1 21. The apparatus of Claim 20 wherein said means for queuing further comprises:
- 2 a plurality of secondary queues;
- 3 means for assigning a predefined threshold value with each of said plurality of primary queues;
- 4 means for monitoring each of said plurality of primary queues to determine whether the capacity
- 5 level associated with said queue exceeds said predefined threshold value; and
- 6 means for queuing any additional packets, in response to said determination, to one of said
- 7 plurality of secondary queues.
- 1 22. The apparatus of Claim 21 wherein certain of said plurality of secondary queues are assigned to
- 2 particular one of said plurality of primary queues.
- 1 23. The apparatus of Claim 21 wherein said plurality of secondary queues comprises:
- 2 an expedited forwarding queue;
- 3 an assured forwarding queue; and
- 4 a best effort queue.
- 1 24. The apparatus of Claim 20 wherein said plurality of primary queues further comprises:
- 2 a high priority egress queue;
- 3 a medium priority egress queue; and
- 4 a low priority egress queue.